

Commodity Price Super-Cycle: What lies ahead?



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Introduction

- Oil and other commodities are important for Canada's economy
- Commodity prices go through long-cycles driven by supply and demand fundamentals
- Commodity prices have significant implications for monetary policy

Importance of Natural Resources to the Canadian Economy

	Share of Real GDP		Share of Nominal Exports	
	2002	2014	1999	2014
Oil	6%	6%	8%	18%
Other Commodities	13%	11%	28%	32%
Total Commodities	19%	17%	36%	50%

Source: Statistics Canada, Bank of Canada calculations

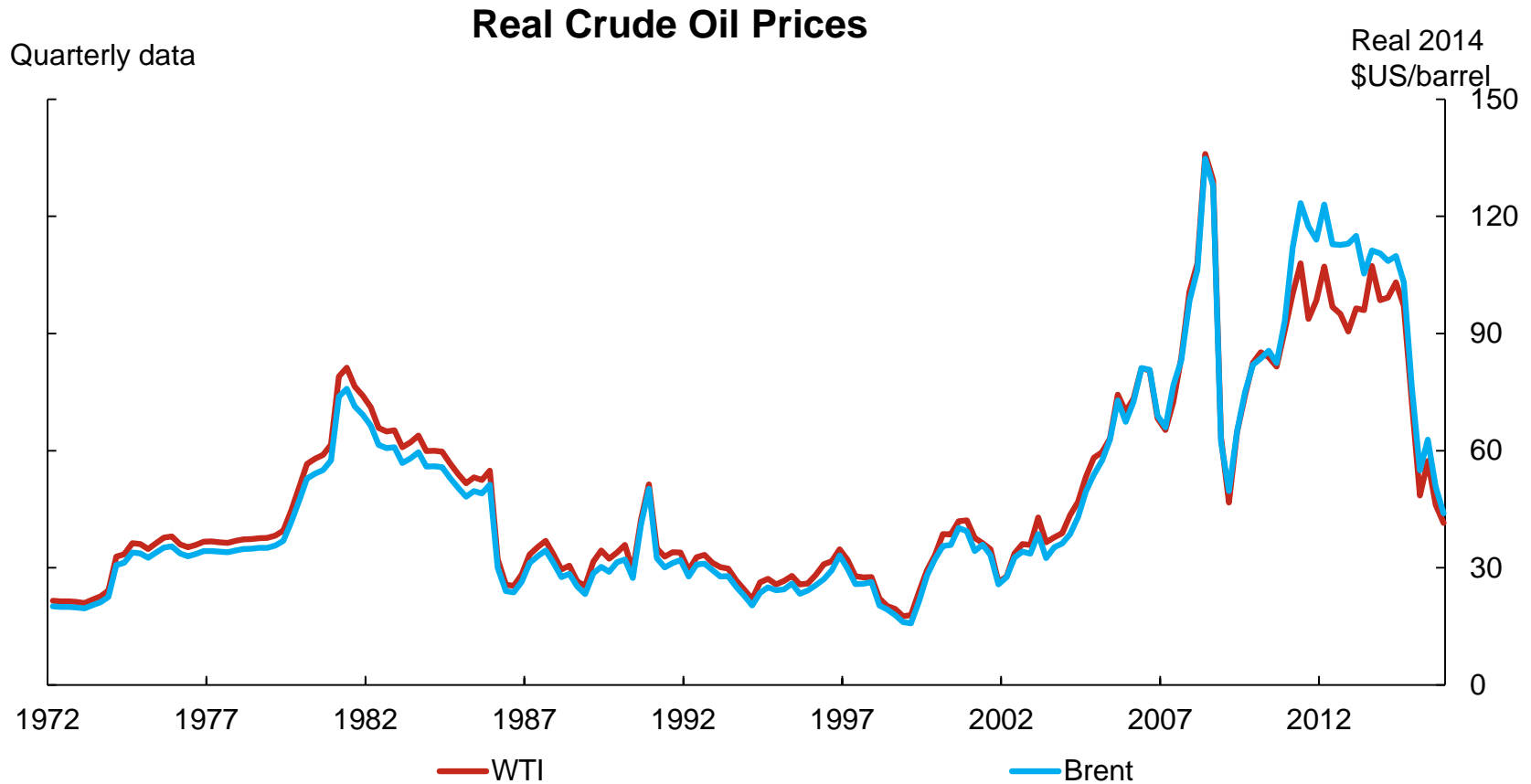
Outline

- Stylized Facts
- Financialization of commodities
- Fundamentals and commodities
 - Measurement of commodity price super cycle
 - Definition and identification
 - Crude oil
 - Non-energy commodities
 - Base metals
 - Agricultural products: grains and livestock
- Conclusion and next steps

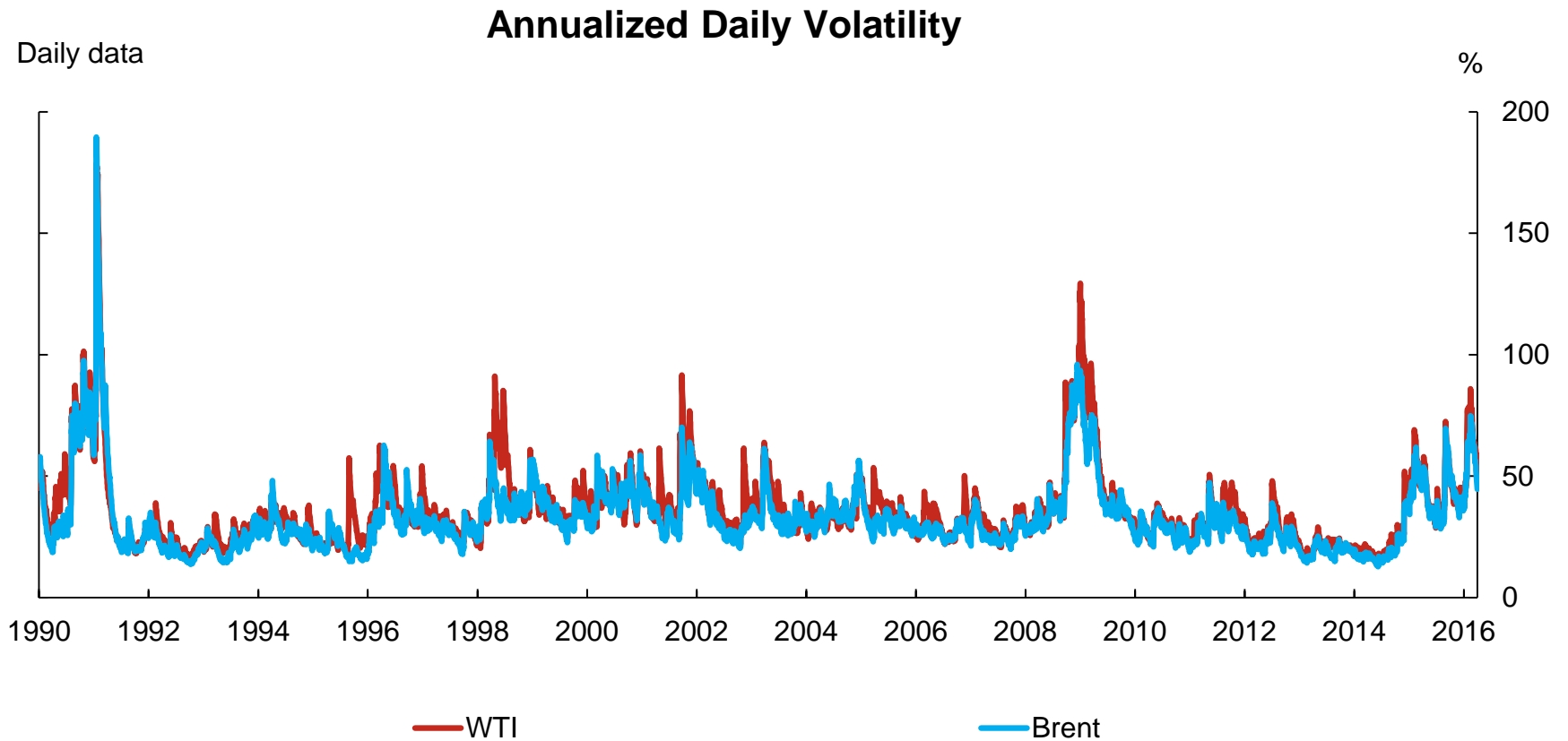
1. Stylized Facts



Stylized Fact I: Elevated price levels



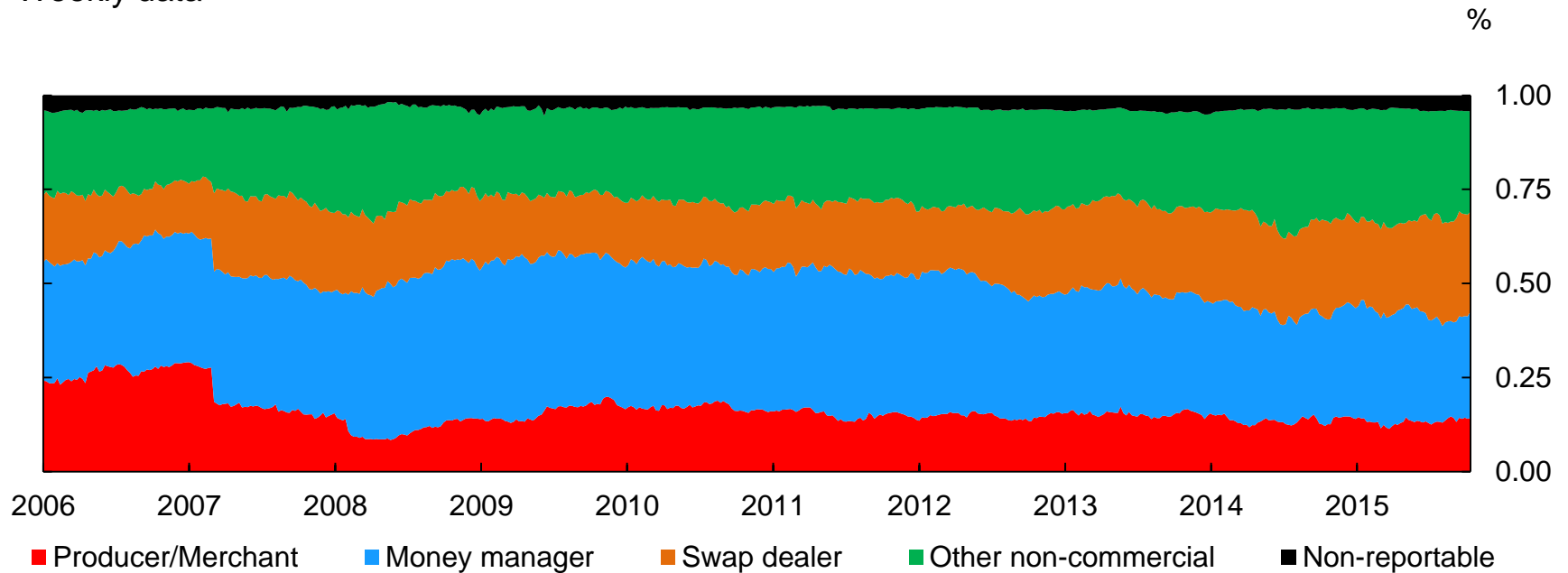
Stylized Fact II: Rapidly fluctuating prices



Stylized Facts III: Increased participation of MMTs and CITs

WTI Futures Market Share by trader Category

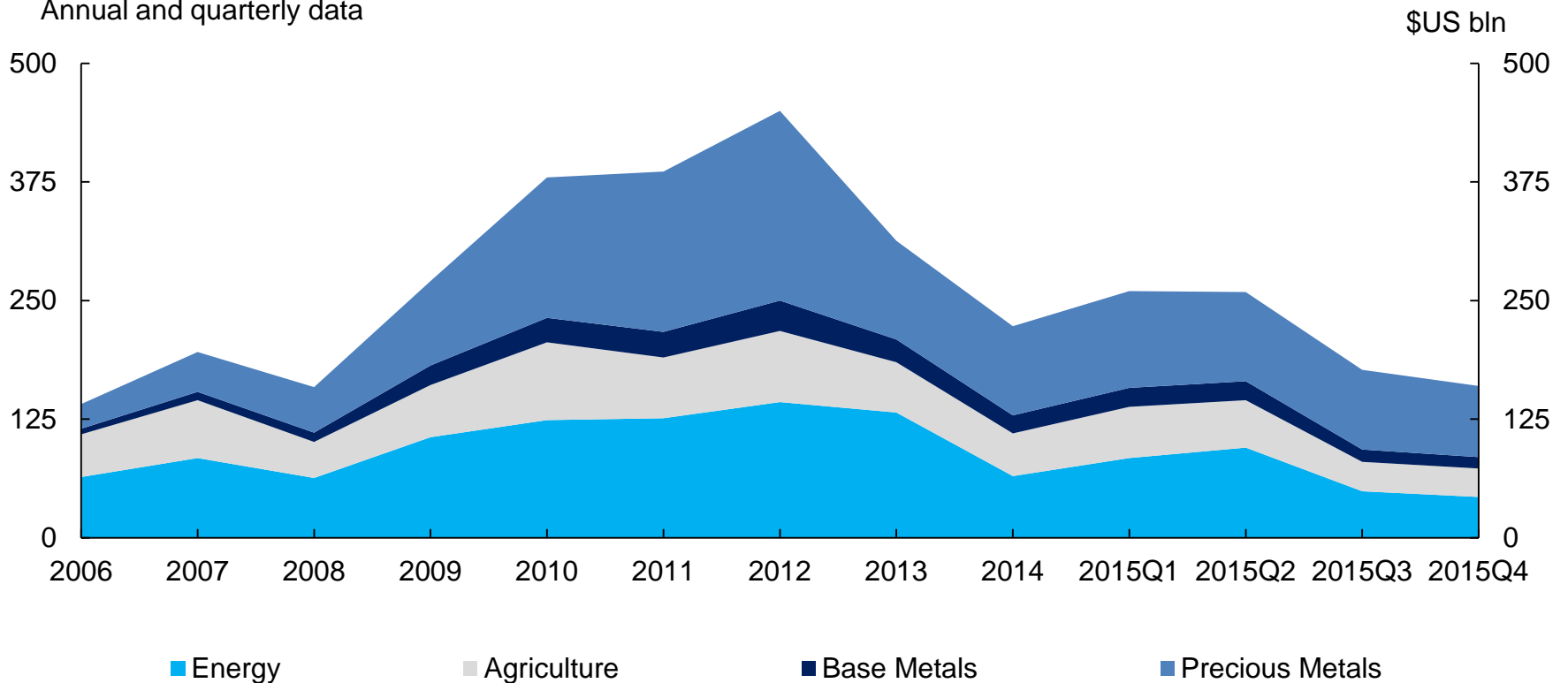
Weekly data



Fact 4: Increased participation of index traders

Increased participation of index traders

Annual and quarterly data

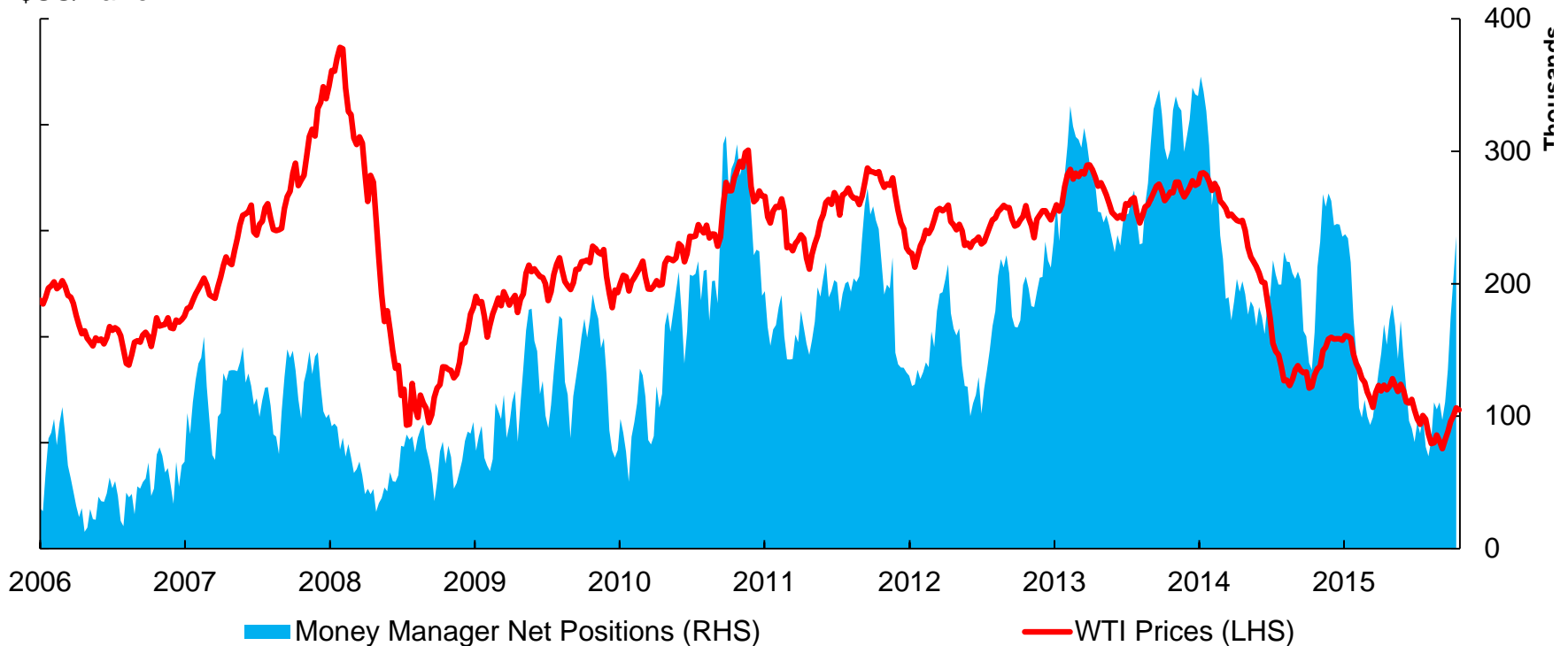


Fact 5: Strong correlation between net money managers' positions and prices

Money Manager Position and WTI Future Prices

Weekly data
\$US/Barrel

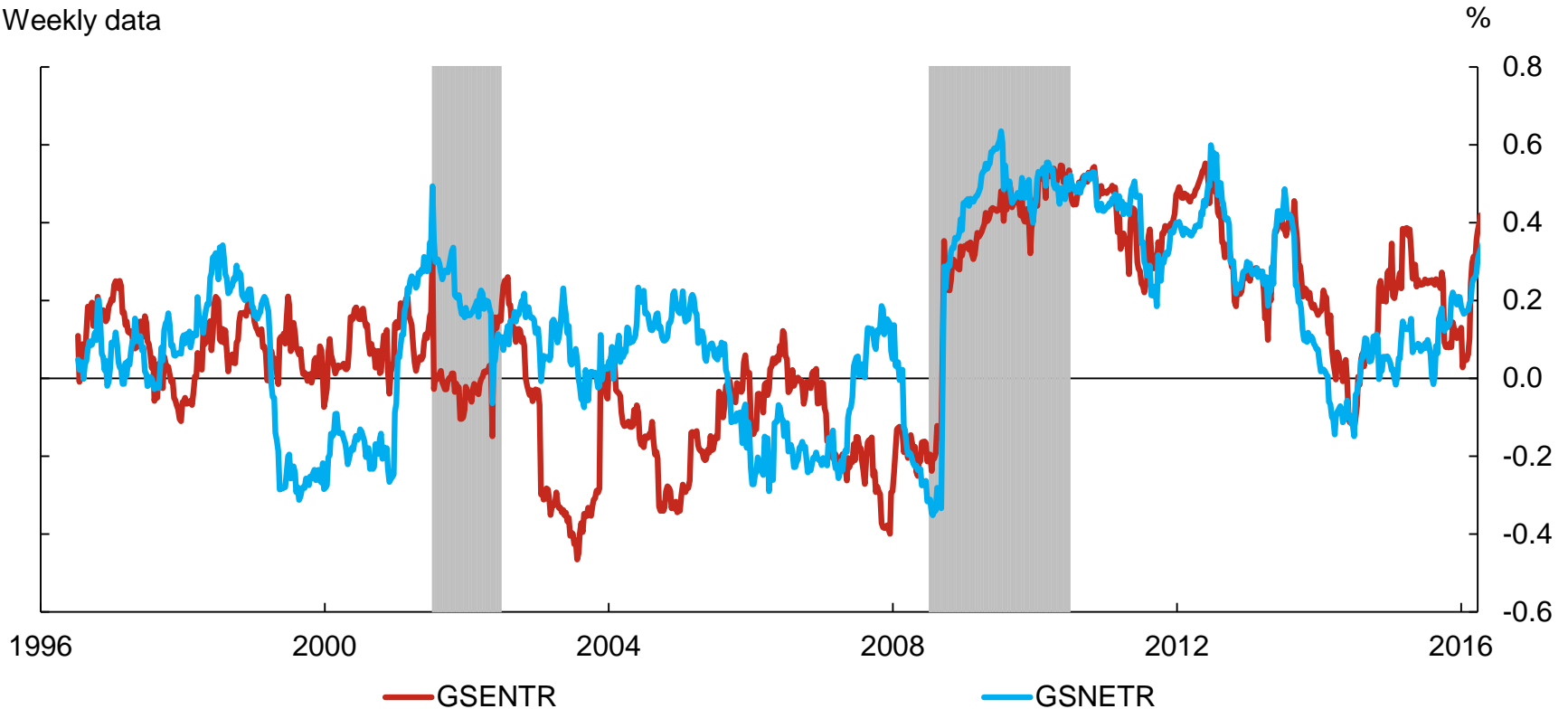
Thousand contracts



Stylized Facts IV: Increased correlation between asset classes

Correlation between weekly return on S&P 500 and GSENTR Index and GSNETR Index

Weekly data



Sources: Bank of Canada calculation

Last observation: March 25 2016

2. Financialization of Commodities



Potential benefits and costs of financialization

■ Benefits

- More efficient derivative pricing methods - price discovery generally takes place in derivatives markets (Buyuksahin et al., 2008)
- helping physical crude oil markets become more integrated by reducing transaction costs and facilitate arbitrage across geographically distant markets and across crude oil of different quality (Fattouh, 2010)
- Reducing the market price of risk (Pirrong, 2011)

■ Costs

- Divergence of prices from “fundamentals”
- Excessive volatility
- Erosion of long-run diversification benefits

Do Speculators Drive Crude Oil Prices?

- A simple question

- Is speculative activity destabilizing markets?
 - Is speculative activity moving prices?
- Theory: Stabilizing Speculation
 - Profitable speculation must involve buying when the price is low and selling when the price is high (Friedman, 1953)
 - Speculators fill hedgers' demand-supply imbalances and provide liquidity to the market (Keynes, 1923)
 - Speculative activity reduces cost of hedging (Hirshleifer, 1990 and 1991)
- Theory: Destabilizing Speculation
 - Shleifer and Summers (1990) note that herding can result from investors reacting to common signals or overreacting to recent news.
 - Long et al. (1990) show, rational speculators trading via positive feedback strategies can increase volatility and destabilise prices.

Correlation does not imply causation

- Limited evidence of link between speculators' positions and prices

No impact:

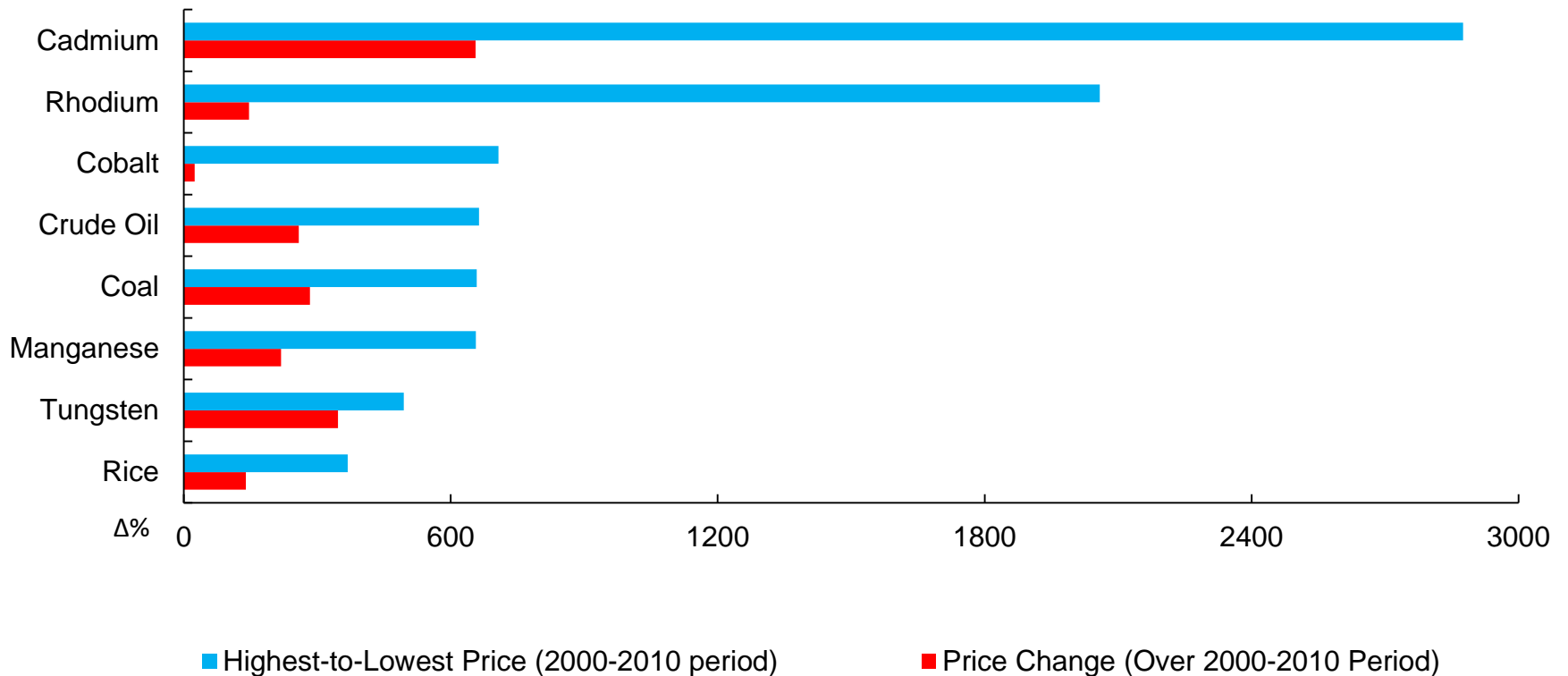
- Buyuksahin and Harris (2011)
- Alquist and Gervais (2013)
- Buyuksahin, Brunetti and Harris (2013)
- Irwin and Sanders (2011, 2013)

Some impact:

- Singleton (2011)
- Tang and Xiong (2010)
- Mou (2010)

Increase in prices is not unique to exchange-traded commodities

Performance of crude oil and non-exchange-traded commodities



Herding and Speculation in Crude Oil Market

- Herding behaviour might be destabilizing

- But (Buyuksahin et al. 2013, 2015)
 - Herding in futures markets is comparable to what we see in the stock market
 - Herding has stabilizing effect

Increased correlation between commodities and equities

- Increase in correlation between commodities and other assets due to financialization
- But (Buyuksahin, Robe and Bruno (2013), Buyuksahin and Robe (2013, 2012), Alquist and Coibion (2013))
 - Activities of financial players, commodity prices and other asset prices appear to be increasingly responding to global business conditions
- Temporary prevalence of the common factor (the risk on factor)

3. Fundamentals and Commodities



What explains elevated/depressed commodity prices?

- 2004-2008 Price Increase
 - Low price elasticities of supply and demand
 - Persistent demand shocks
- More than 50% decline in oil prices between June 2014 and January 2015
 - Both supply and demand played an important role, but contribution from supply is much higher in the collapse in prices
 - In that sense, it is similar to 1985/86 episode rather than 2008/2009 episode
 - Rapid growth in North American oil since 2010 (growth in North Sea and Gulf of Mexico); around 6mb/d increase in oil production
 - Change in OPEC policy from price level targeting to market share concerns
 - However; drop in oil prices display different market structure than 1985/86 episode
 - Low spare capacity
 - Both supply and demand are more elastic

1. Defining a commodity price super-cycle



Definition of Commodity Price Super-cycle

- Our definition: An extended period during which prices differ significantly and persistently from their long-run trend.

- Do commodity price super-cycle really exist?
 - Skepticism from some academics
 - Super-cycle consistent with our understanding of relatively low price elasticity of supply for many commodities

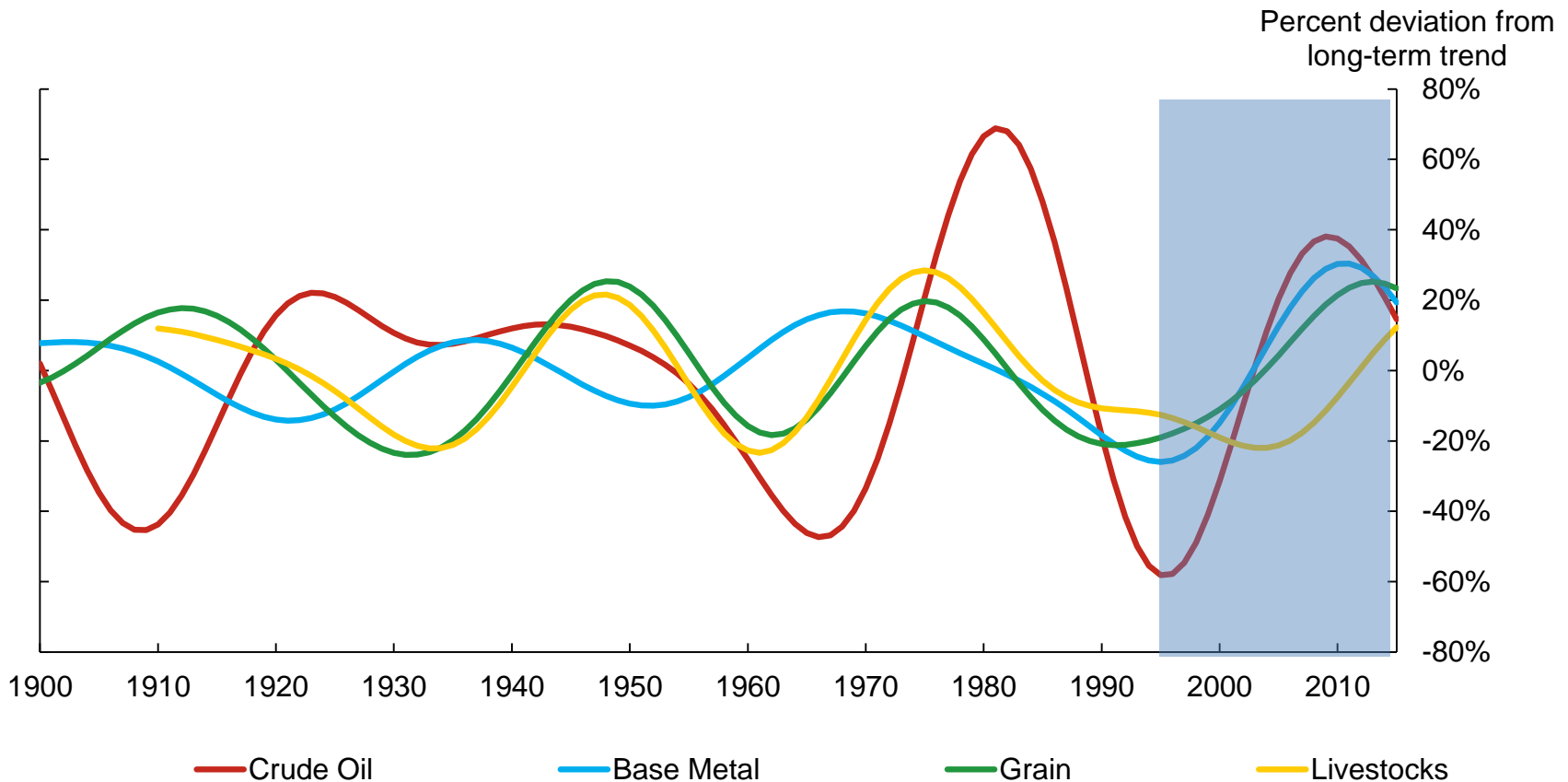
Methodology for measuring super-cycle

- Cyclical movements in commodity prices are classified into different groups based on their periodicity
 - Long-run trend: 70+ years
 - **Super-cycle: 20-70 years**
 - Short-term volatility: <20 years

- An asymmetric Band-Pass filter is applied to the time series.
 - No requirement for economic model to explain data
 - Commodity prices represented as a combination of cyclical components of various periodicities

Most recent super-cycle began in the late 1990s

Super-cycle components for various groups of commodities



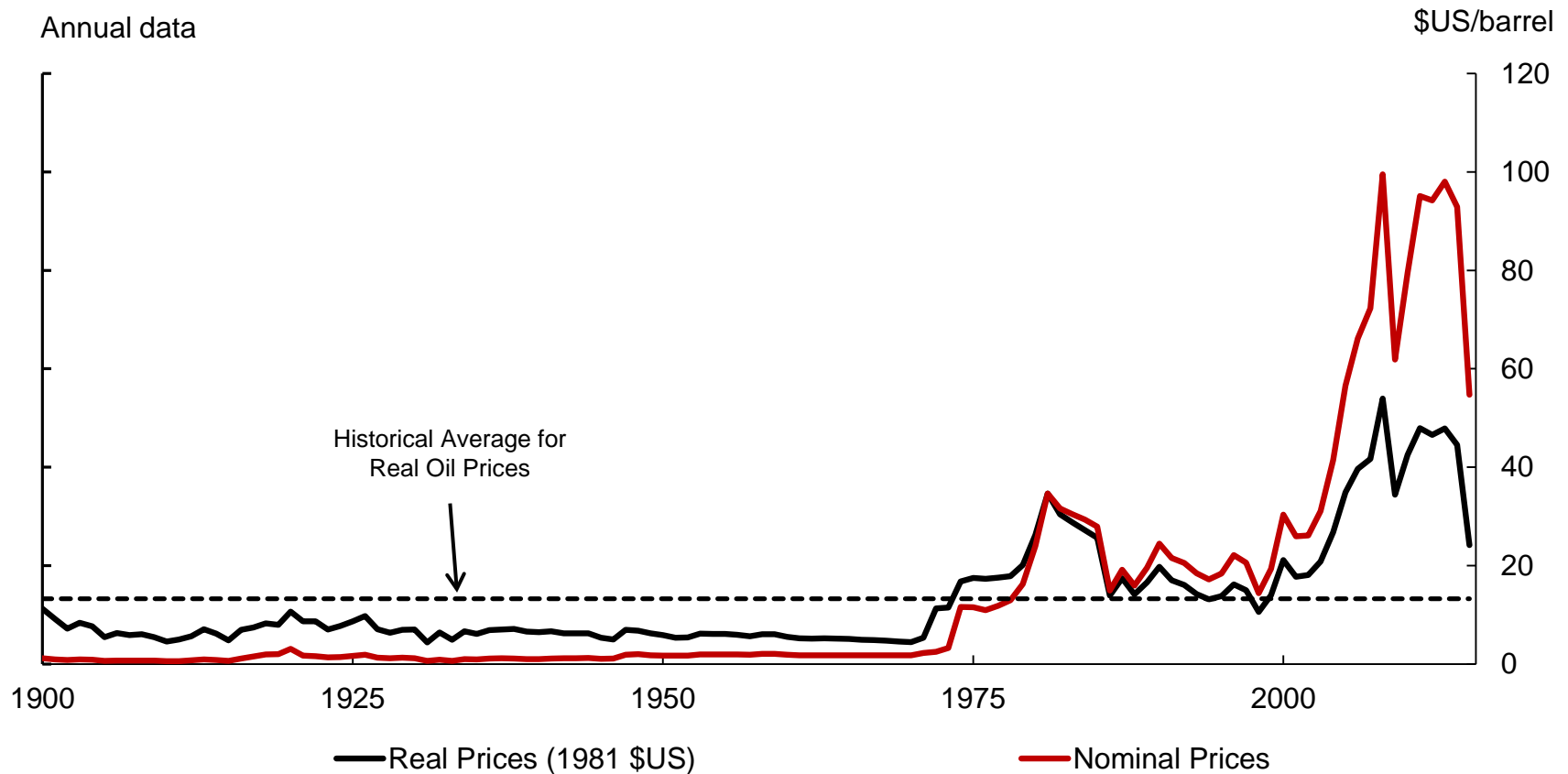
Source: Bank of Canada calculation

Last observation: 2015

2. Crude Oil



Oil prices still elevated relative to historical average

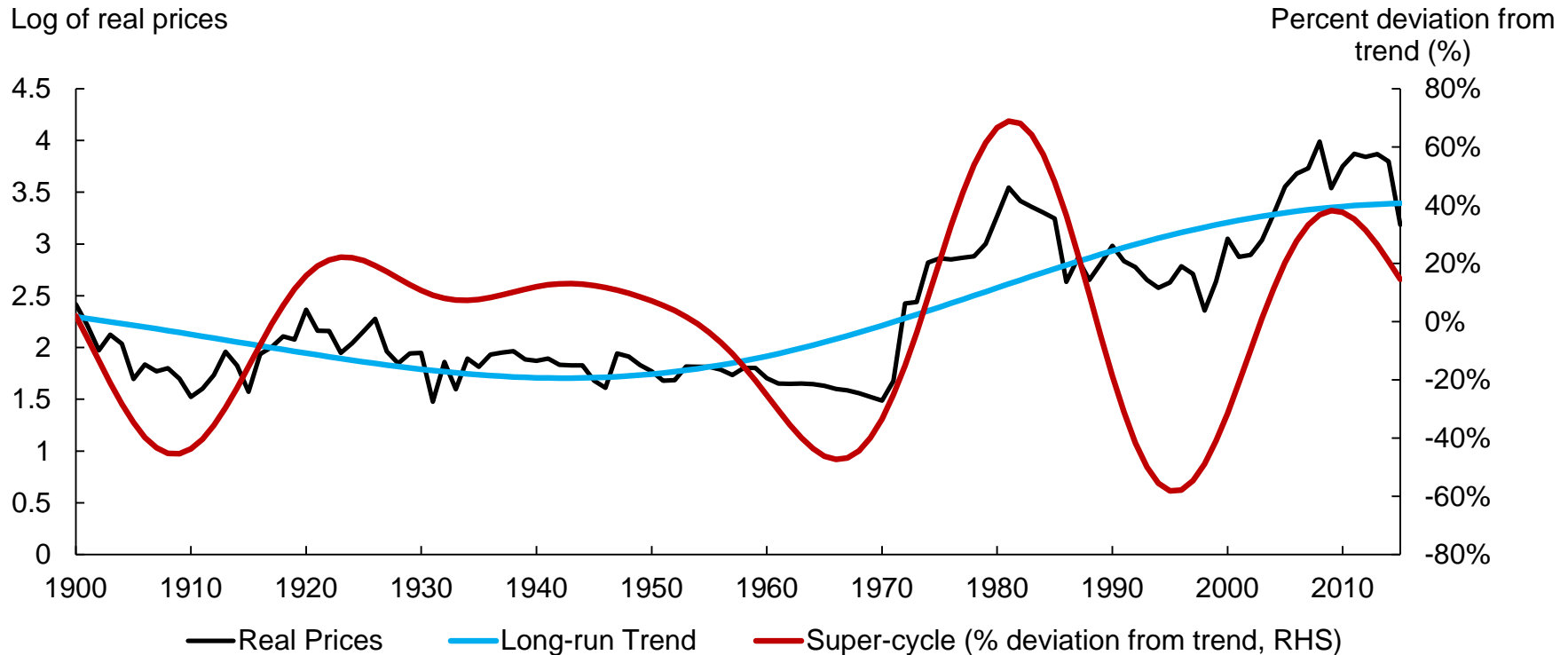


Source: Bank of Canada calculation

Last observation: 2015

Super-cycle for crude oil now in the down turn

Super-cycle for crude oil now in the downturn



Source: Bank of Canada calculation

Last observation: 2015

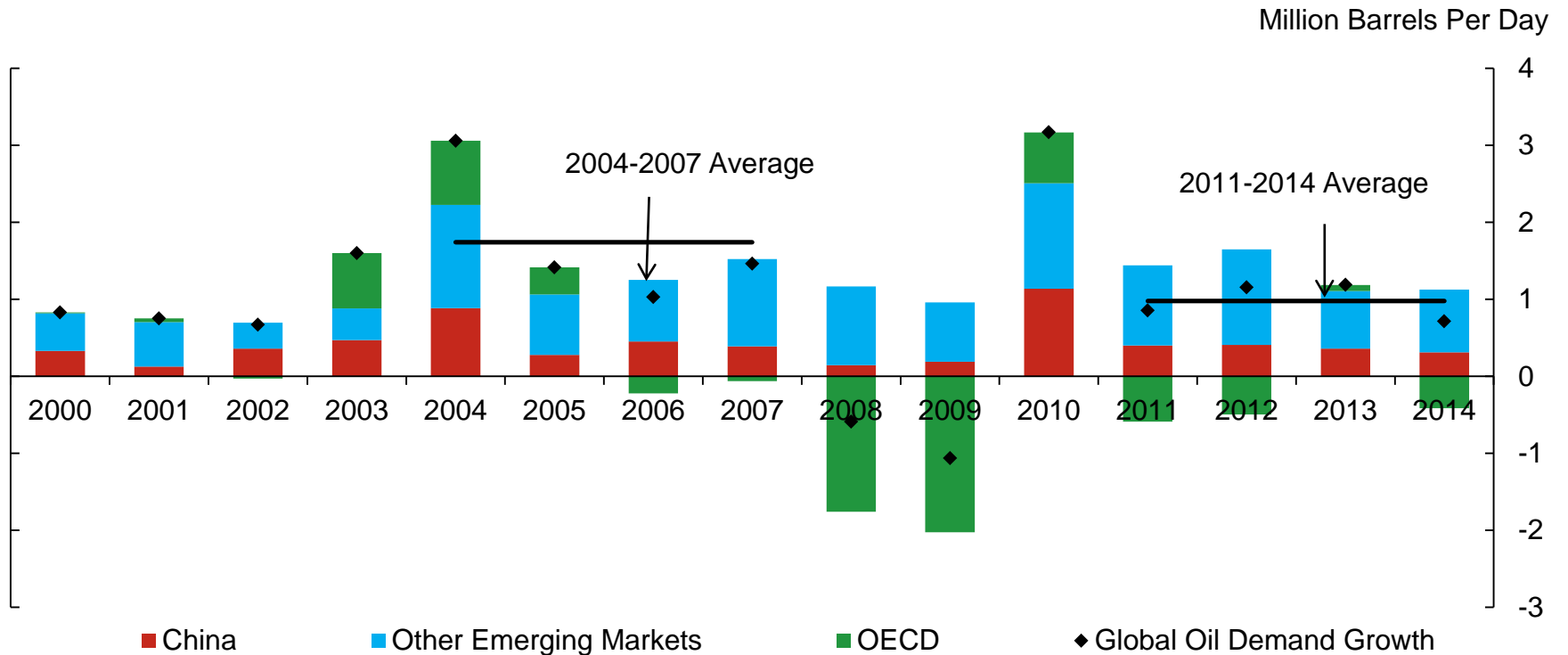
Why are we in the downswing?

- Slowing global oil demand growth
 - Contraction in OECD oil consumption
 - Slower oil demand growth in China

- Strong supply response
 - U.S. shale revolution
 - Other unconventional oil: Canadian oil sands, deep-water

Slowing demand growth

Contribution to Global Oil Demand Growth by Region

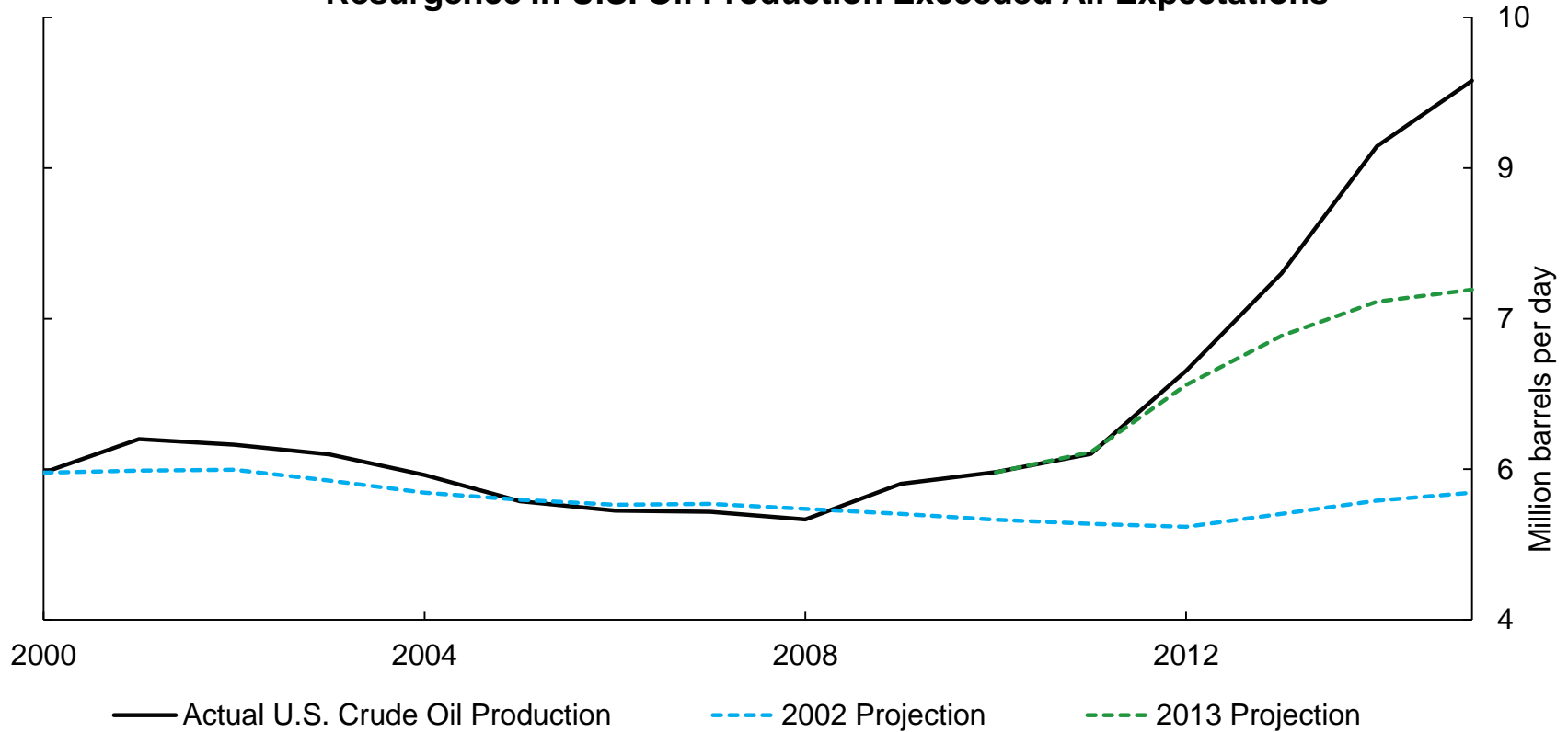


Source: International Energy Agency and Bank of Canada Calculations

Last observation: 2015

U.S. shale revolution

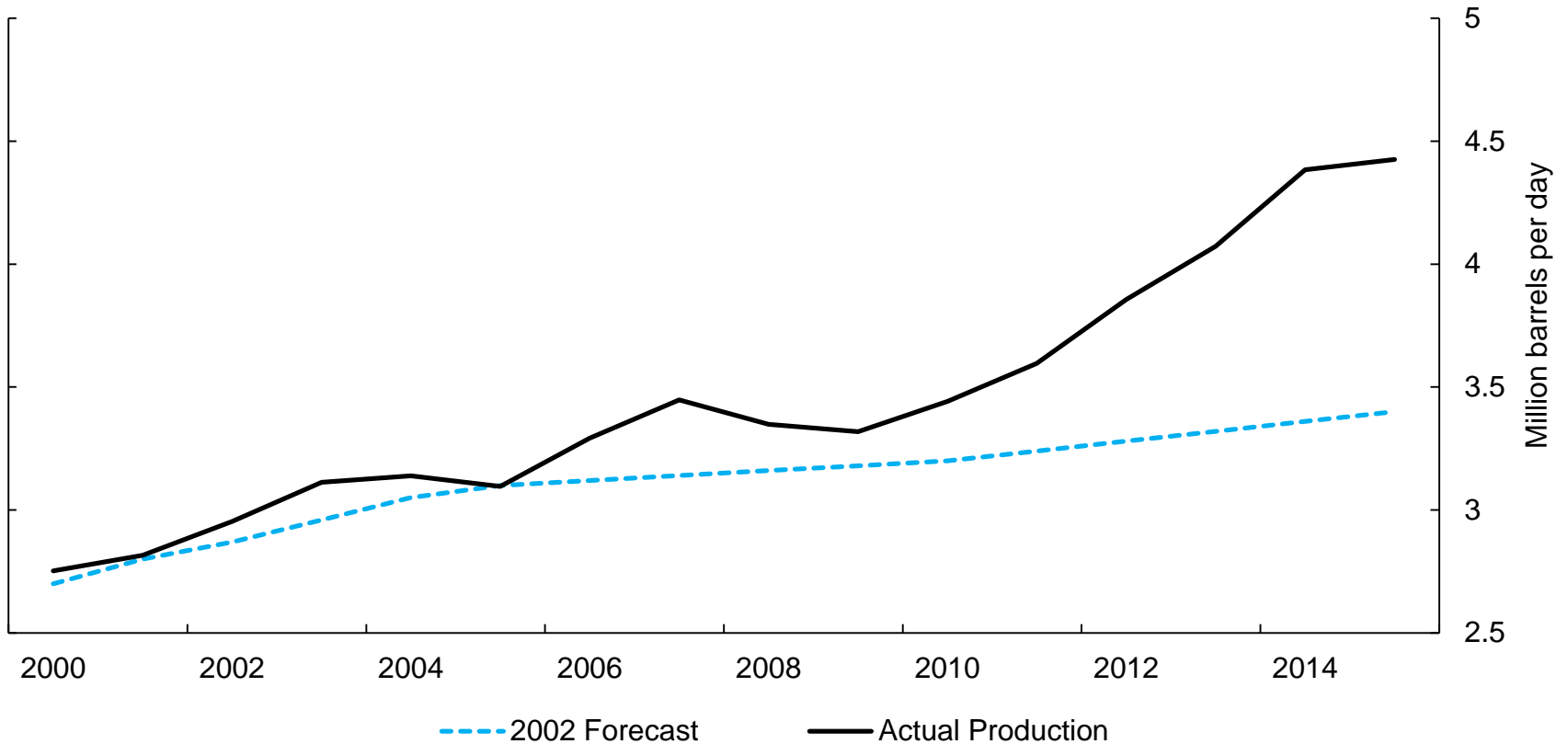
Resurgence in U.S. Oil Production Exceeded All Expectations



Source: U.S. Energy Information Administration

Last observation: 2015

Canadian oil production has also exceeded expectations



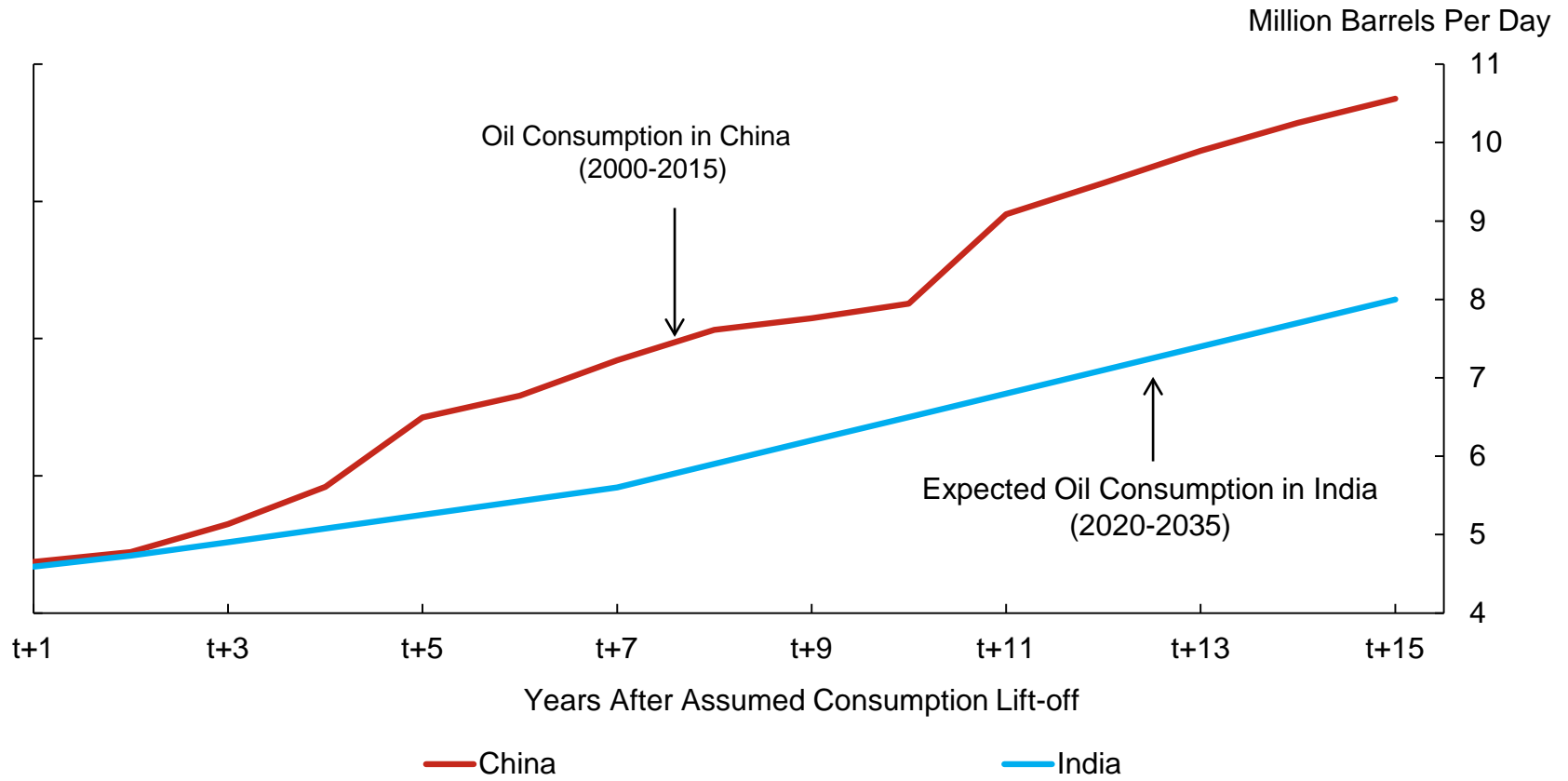
Source: U.S. Energy Information Administration

What lies ahead for oil?

- Downswing phase of oil price super-cycle likely to continue
 - Cycle within a cycle?

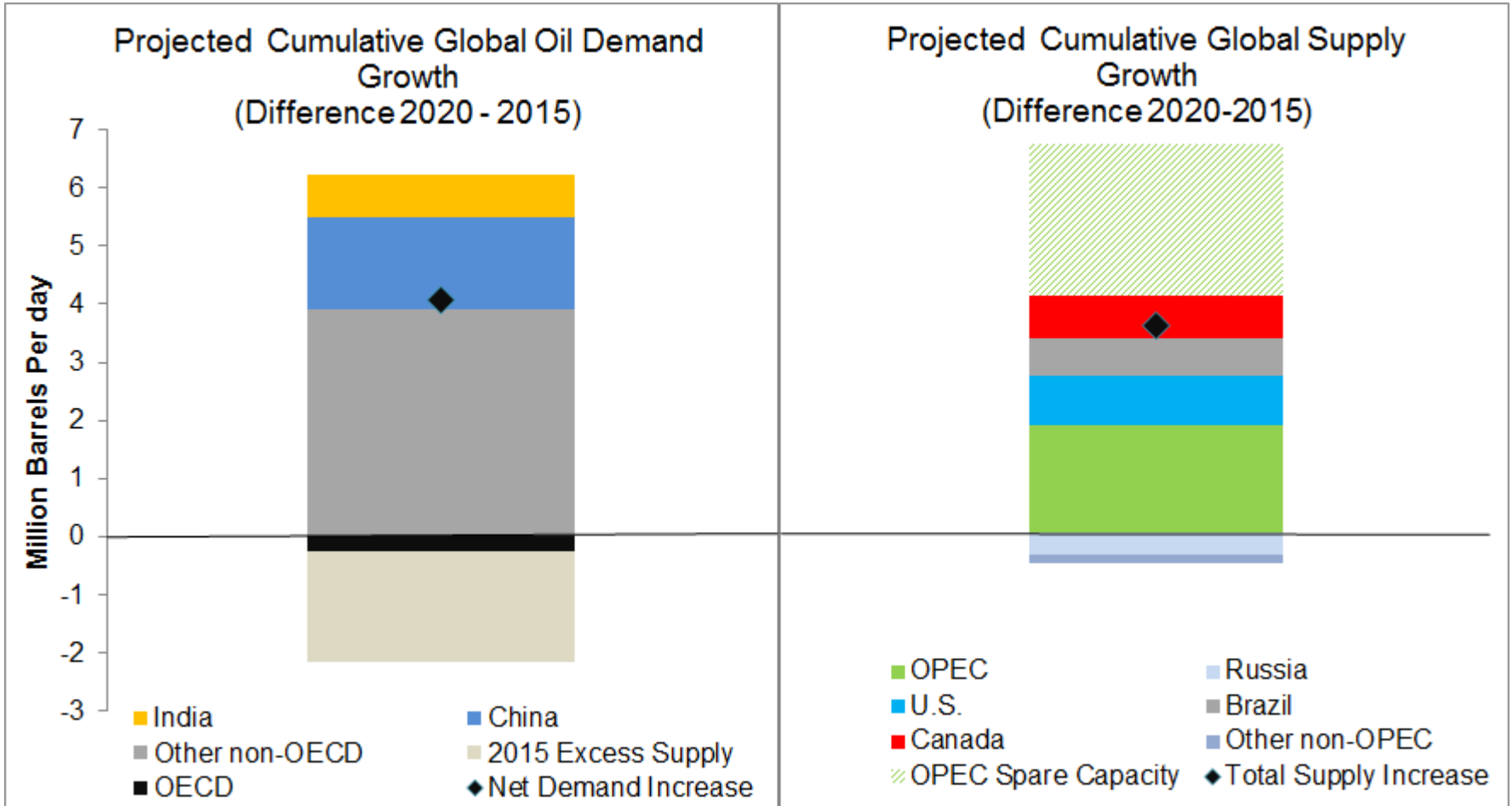
- What could trigger the next upswing in oil prices?
 - Emergence of India and other EMEs
 - Recent cuts to investment may result in supply constraints in the early 2020s

India's oil consumption to rise quickly, though not rivalling the pace of China over the last decade



Source: International Energy Agency

High-cost unconventional oil, including Canadian oil sands, still needed to meet rising demand

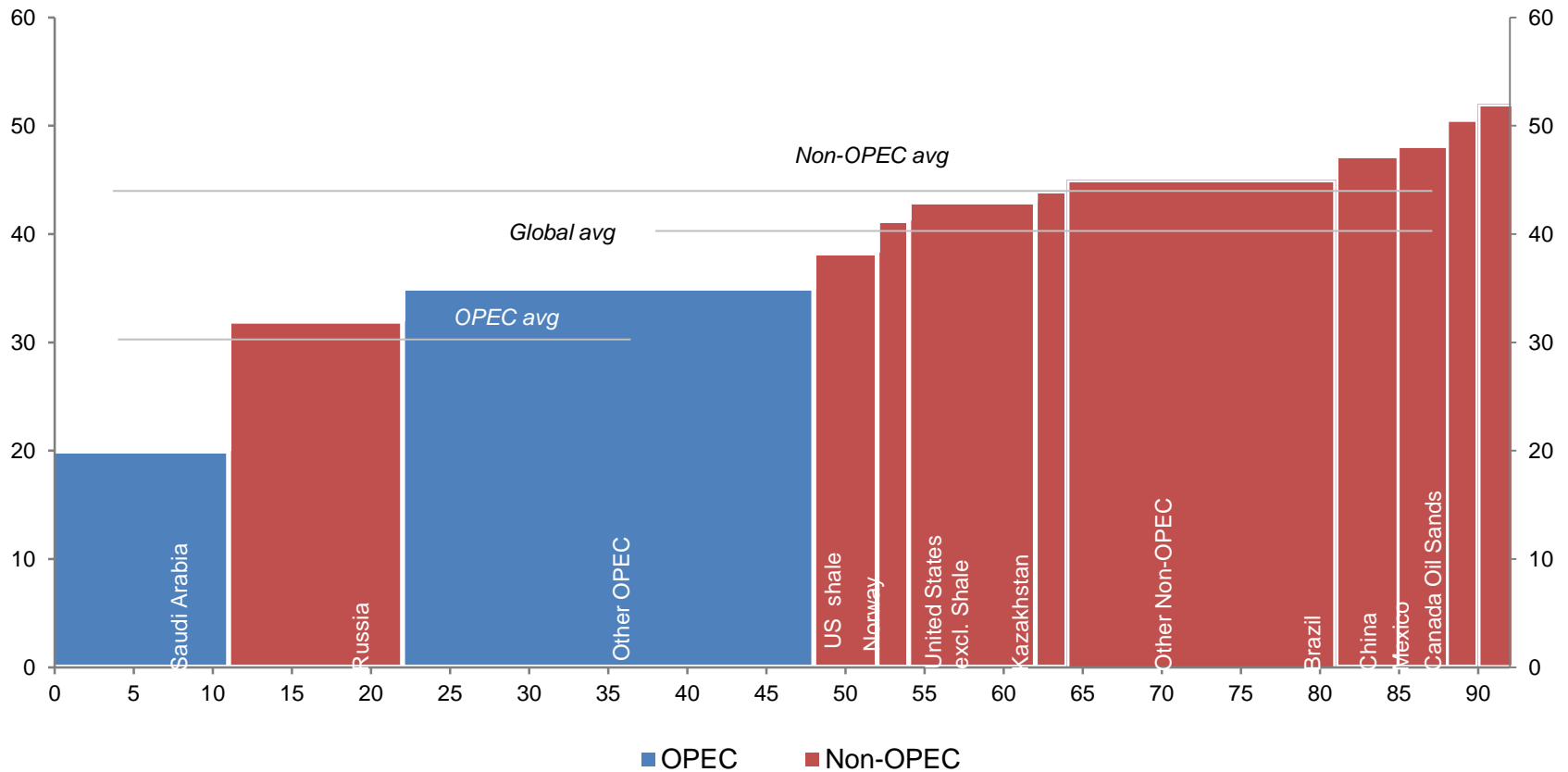


Source: International Energy Agency, Bank of Canada calculations

Unconventional oil projects require high prices

Full-Cycle Break-Even Costs of Production

Average cost (US\$/barrel)



Source: Company Reports, Energy Aspects

Key takeaways

- Downswing phase of oil price super-cycle to continue
 - Oversupply in market needs time to work off
 - Chinese oil demand growth weak compared to last decade

- Ingredient in place to begin a new upswing next decade
 - Steady lift-off in Indian and other EMEs demand
 - Current cuts to investment may limit ability for supply to meet rising demand

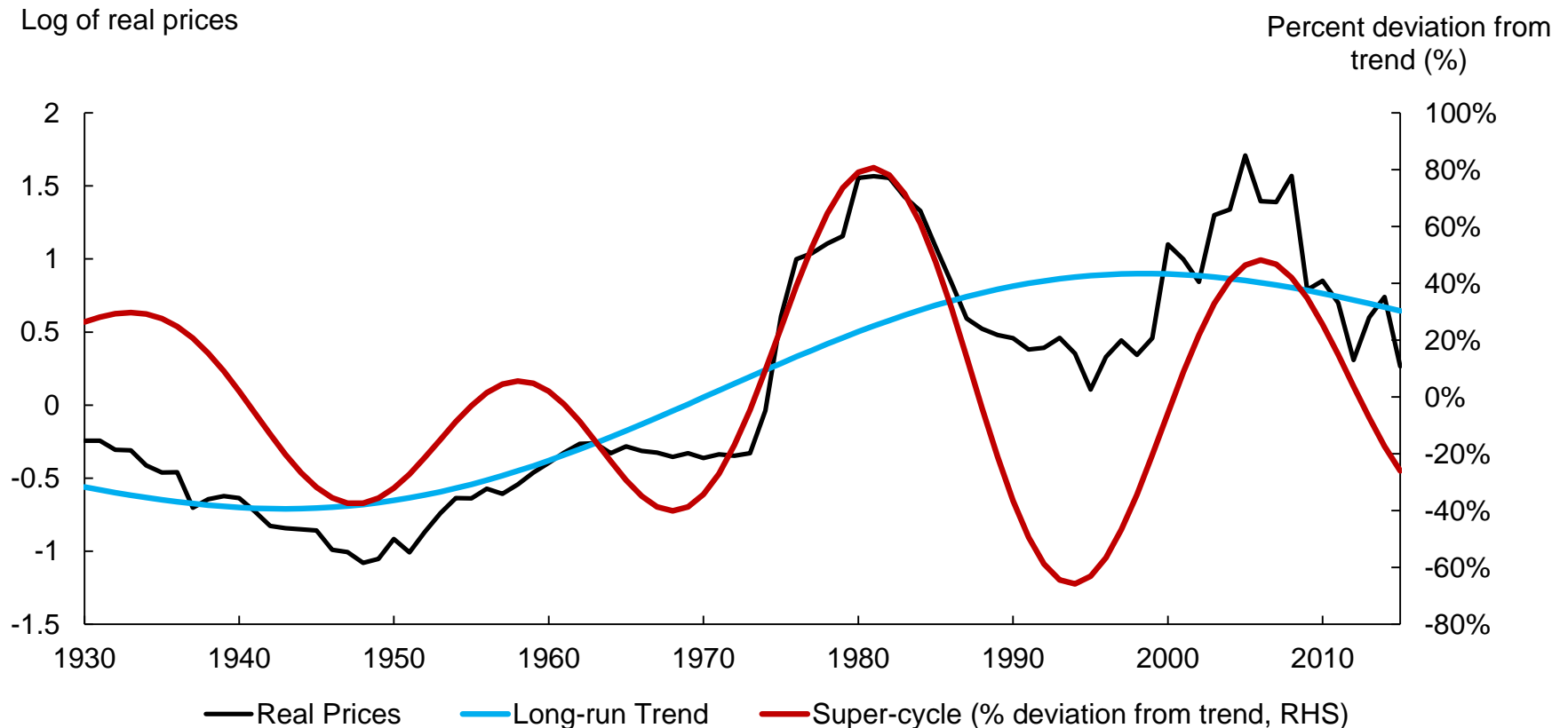
- Canadian oil supply needed to meet rising demand over the long-run

2. Natural Gas



Super-cycle for natural gas also in downswing

Super-cycle for natural gas also in downswing



Source: Bank of Canada calculation

Last observation: 2015

Explaining the natural gas price super-cycle

- Upswing in natural gas prices began in mid-1990s
- Turned lower since 2006
 - Discovery and development of U.S. shale gas
 - U.S. natural gas production up 35 per cent since 2006
- What lies ahead for natural gas prices?
 - Downswing should trough early next decade if not in the coming years
 - Potential demand pressure after entry into Asian/European markets where natural gas prices are relative high and demand growth is solid

4. Conclusion and next steps



Is the commodity super-cycle over?

- Downswing of the current super-cycle likely to continue.
 - Slower demand growth in China. Shift in its pattern of growth also suggest uneven impact on different group of commodities
 - Supply response materializing

- Factors remain in place to support a new upswing
 - Chinese commodity consumption to remain elevated
 - India to provide incremental demand pressure starting next decade
 - Supply response to the current low price environment

Next steps

- Can we model long-run cycles in commodity prices?
 - Make use of slow-moving variables such as urbanization rate, per capita income, technically recoverable reserves, etc.
- The current super-cycle may be ending sooner than previous cycles: what is different this time?
 - Supply adjustments taking place sooner
 - Higher international trade facilitates adjustment of market imbalance by linking different regional markets
- Impact of super-cycle on commodity producers and consumers